

USSN: 10/060,793
Attorney Docket No.: 6884.US.01
Amendment Under 37 C.F.R. 1.312

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (previously presented): An isolated nucleic acid sequence comprising or complementary to a nucleotide sequence encoding a polypeptide having desaturase activity, wherein the amino acid sequence of said polypeptide comprises SEQ ID NO:26.

Claim 2 (previously presented): An isolated nucleic acid sequence comprising or complementary to a nucleotide sequence comprising SEQ ID NO:25.

Claim 3 (cancelled)

Claim 4 (previously presented): The isolated nucleic acid sequence of claim 2, wherein said sequence encodes a functionally active desaturase which utilizes a polyunsaturated fatty acid as a substrate.

Claim 5 (previously presented): The isolated nucleic acid sequence of claim 1 or 2, wherein said sequence is from *Saprolenia diclina*.

Claims 6-39 (cancelled)

Claim 40 (new): A method of producing a desaturase comprising the steps of:

- (a) isolating said nucleic acid sequence of claim 1;
- (b) constructing a vector comprising said isolated nucleic acid sequence of step (a); and
- (c) introducing said vector of step (b) into a host cell for a time and under conditions sufficient for expression of a desaturase encoded by said isolated nucleic acid sequence of step (a).

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Claim 41 (new): An isolated vector comprising: (a) said isolated nucleic acid sequence of claim 1, operably linked to (b) a regulatory sequence.

Claim 42 (new): An isolated host cell comprising said vector of claim 41.

Claim 43 (new): The isolated host cell of claim 42, wherein said host cell is a eukaryotic cell selected from the group consisting of a mammalian cell, an insect cell, a plant cell and a fungal cell.

Claim 44 (new): The isolated host cell of claim 43, wherein expression of said isolated nucleic sequence of said vector results in said host cell producing a polyunsaturated fatty acid that is not produced in a wild-type of said host cell.

Claim 45 (new): An isolated plant cell, plant, or plant tissue comprising said vector of claim 41, wherein expression of said nucleic acid sequence of said vector results in production of a polyunsaturated fatty acid by said plant cell, plant or plant tissue.

Claim 46 (new): The isolated plant cell, plant, or plant tissue of claim 45, wherein said vector induces the production of a polyunsaturated fatty acid selected from the group consisting of linoleic acid, eicosatetraenoic acid and eicosapentaenoic acid.

Claim 47 (new): A transgenic plant comprising said vector of claim 41, wherein expression of said nucleic acid sequence of said vector results in production of a polyunsaturated fatty acid in seeds of said transgenic plant.

Claim 48 (new): A method for producing a polyunsaturated fatty acid comprising the steps of:

- (a) isolating said nucleic acid sequence of claim 1;
- (b) constructing a vector comprising said isolated nucleic acid sequence of step (a);

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- (c) transforming the vector of step (b) into a host cell for a time and under conditions sufficient for expression of a desaturase encoded by said isolated nucleic acid sequence of step (a); and
- (d) exposing said expressed desaturase to a fatty acid substrate, whereby said substrate is catalytically converted by said desaturase into a desired polyunsaturated fatty acid product.

Claim 49 (new): The method of claim 48, wherein said substrate is dihomogamma-linolenic acid or arachidonic acid and said product polyunsaturated fatty acid is eicosatetraenoic acid or eicosapentaenoic acid, respectively, when said expressed desaturase is an omega-3-desaturase.

Claim 50 (new): The method of claim 48, further comprising, after step (d), the step of:

- (e) exposing said polyunsaturated fatty acid product of step (d) to one or more enzymes selected from the group consisting of a desaturase and an elongase, whereby the polyunsaturated fatty acid product of step (d) is catalytically converted into another polyunsaturated fatty acid product.

Claim 51 (new): The method of claim 50, wherein said product polyunsaturated fatty acid is eicosatetraenoic acid or eicosapentaenoic acid and said another polyunsaturated fatty acid is eicosapentaenoic acid or omega 3-docosapentaenoic acid, respectively, when said expressed desaturase of step (d) is an omega 3-desaturase.

Claim 52 (new): The method of claim 50 further comprising the step of exposing said another polyunsaturated fatty acid to one or more enzymes selected from the group consisting of a desaturase and an elongase in order to convert said another polyunsaturated fatty acid to a final polyunsaturated fatty acid.

Claim 53 (new): The method of claim 52 wherein said final polyunsaturated fatty acid is selected from the group consisting of omega 3-docosapentaenoic acid and

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docosahexaenoic acid, when said expressed desaturase of step (d) is an omega 3-
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